Tubika firmware installation

Flashing the motherboard / voicecards firmware

This section explains how to flash Tubika's firmware with an AVR programmer – in case you are building it from scratch (the kits come with pre-programmed chips). This is also helpful if you intend to modify the code.

Option 1: build the code and upload it with avrdude

The firmware code is hosted on **github**, in the controller and voicecard directories. The required tools are python 2.5, GNU make, avrdude, and avr-gcc version 4.3.3 (if you use another version you might have to check that the voicecard code size is under 31744 bytes and the motherboard code size under 61440 bytes). Some of the paths to these tools have to be edited in avrlib/makefile.mk
To build the motherboard code (including MIDI/SD bootloader) and flash it, connect the programmer to the motherboard and use:

```
make bootstrap_controller
```

To build the voicecard code (including bootloader) and flash it, connect the programmer to a voicecard and use:

```
make bootstrap_voicecard
```

- **Tubika_controller.hex**
- **Tubika_controller_boot.hex**
- **Tubika_voicecard.hex**
- **Tubika_voicecard_boot.hex**
- **Tubika_voicecard_eeprom_golden.hex**

Connect the programmer to the motherboard. Type the following commands in a terminal/command line:

```
avrdude -B 100 -V -p m644p -c avrispmkII -P usb -e -u -U
efuse:w:0xfd:m -U hfuse:w:0xd2:m -U lfuse:w:0xff:m -U
lock:w:0x2f:m
```

```
avrdude -B 1 -V -p m644p -c avrispmkII -P usb -U
flash:w:ambika_controller.hex:i -U
flash:w:ambika_controller_boot.hex:i -U lock:w:0x2f:m
```

Hook the programmer to the voicecard. Type the following commands in a terminal/command line:

```
avrdude -B 100 -V -p m328p -c avrispmkII -P usb -e -u -U
efuse:w:0xfd:m -U hfuse:w:0xde:m -U lfuse:w:0xff:m -U
lock:w:0x2f:m
```

```
avrdude -B 1 -V -p m328p -c avrispmkII -P usb -U
flash:w:ambika_voicecard.hex:i -U
flash:w:ambika_voicecard_boot.hex:i -U
eeprom:w:ambika_voicecard_eeprom_golden.hex:i -U lock:w:0x2f:m
```

Note that in all these commands, you will have to replace:

•avrdude by the path to your local install of avrdude (for example C:\WinAVR\bin\avrdude on windows).
•avrispmkII by the name of your ISP programmer.
•usb by something else if your ISP programmer is not a USB one.

Copying the "factory data" (presets) to a SD card

1.Format a SD card with a FAT or FAT32 filesystem (all the brand new voicecards we tested were correctly formatted).
2.Unzip **this archive** and copy the PROGRAM and MULTI directories to the root directory of the SD card.